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The Region of the Larynx

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from the prevertebral muscles and their fascia by the loose but strong *post-pharyngeal fascia*, which is connected with the sheaths of the carotid vessels on each side (Plate 13), and which has an extension outward by the gap in the deep cervical fascia by which the pharyngeal wall is brought into relation with the parotid region, as in post-pharyngeal abscess (page 133). In the connective tissue between the back of the pharynx and the axis vertebra there is a little lymphatic gland, which sometimes is the seat of a suppurative collection.

In the areolar layer between the pharyngeal fascia and the constrictor muscles is the *pharyngeal plexus of veins*, made up of numerous intercommunicating veins which branch in all directions and terminate in the internal jugular veins.

The structures of the pharynx receive their arterial blood by branches from the ascending palatine and ascending pharyngeal arteries. The lateral walls of the pharynx are in close proximity, on each side, to the internal carotid artery and to the pneumogastric, glosso-pharyngeal, and hypoglossal nerves (Plate 13, Figs. 2 and 3).

The constrictor muscles are all supplied with nerves from the pharyngeal plexus of nerves, the inferior constrictor receiving in addition twigs from the external and recurrent laryngeal nerves. The lymphatic vessels of the pharynx empty into the deep cervical lymphatic glands, which form a chain along the sheath of the carotid artery and internal jugular vein.

THE REGION OF THE LARYNX.

At the back of the tongue, and behind the stretch of mucous membrane which contains the chain of follicles extending between the tonsils, is the pharyngeal opening of the larynx. It is a triangular aperture, having its base directed toward the tongue, and the cavity of the larynx into which it leads extends as far as the lower border of the cricoid cartilage.

The larynx is the commencement of the respiratory passage, and serves as the organ of the voice, in which are produced the sonorous vibrations caused by the air coming from the lungs, bronchial tubes,

and trachea. It is triangular and broad above, narrow and cylindrical below, and flattened behind and at the sides. It consists of a cartilaginous framework, composed of nine separate pieces, which are united by ligaments and moved by numerous muscles; and its cavity is lined with mucous membrane continuous with that of the pharynx, mouth, and nose above, and with that of the trachea below, but peculiarly modified in this region to subserve the function of phonation. The pharynx, mouth, and nose form the auxiliary apparatus which modifies the sound after it passes from the larynx, adapting it to articulation. **The thyroid cartilage** is the largest cartilage of the larynx, and consists of two lateral quadrilateral portions, the *alæ*, which are united anteriorly at an acute angle, so that they form a vertical median projection. This projection is called the *pomum Adami* (Plate 1, and Plate 53, Fig. 1), and is subcutaneous, being more marked in the male than in the female, and always serving as an important landmark in the front of the neck. It is usually separated from the skin by a bursa mucosa; and there is a *median notch* at the upper part of the projection, the *thyroid notch* (Plates 23, 24, and 25), which allows the cartilage to glide behind the overlying hyoid bone in the act of swallowing. This is accomplished by the mode of attachment of the broad, fibro-elastic, *thyro-hyoid membrane*, which extends from the upper border of the thyroid cartilage to the posterior and upper border of the hyoid bone, a little synovial bursa being interposed between the membrane and the bone. The posterior border of each ala of the thyroid cartilage is free and prolonged upward into a blunt cylindrical process, the *superior cornu*, which is connected to the corresponding greater cornua of the hyoid bone by a *posterior thyro-hyoid ligament*, and downward into a shorter process, the *inferior cornu*, which curves forward and articulates with the outer side of the cricoid cartilage. Both the superior and inferior borders of the *alæ* are notched in front of their respective cornua and present convexly everted lips as they approach each other at the middle line in front. The inferior border affords attachment to the crico-thyroid membrane which connects the thyroid and cricoid cartilages. The outer surface of each ala is smooth and marked by a faint oblique line, which extends from the base of the superior cornu down-

ward and forward and gives attachment to the sterno-thyroid and thyro-hyoid muscles. The inferior constrictor muscle of the pharynx is also attached to the surface behind the oblique line. The inner surface of each ala is slightly concave, smooth, and covered by mucous membrane. The thyroid cartilage is so called from its resemblance to a shield, and because it protects the important structures behind it.

The *cricoid cartilage* very closely resembles a signet-ring (hence its name), and is situated below the thyroid cartilage, with the hoop of the ring forward and in close contact with the top ring of the trachea. The posterior, broad, seal-like portion of the cricoid cartilage is two and a half centimetres, or an inch, in depth, and is received into the interval between the posterior borders of the alæ of the thyroid cartilage. The narrow hoop-like portion of the cricoid cartilage can readily be felt subcutaneously, being prominent in lean and in fat persons at all periods of life, and is therefore always a reliable landmark in the anterior region of the neck. The surface of the upper border of the cricoid cartilage is directed obliquely upward and backward, and gives attachment to the crico-thyroid membrane, which is thicker in front than at the sides and is composed mainly of yellow elastic tissue. Outwardly on each side there is an elevated facet, which articulates with the inferior cornu of the thyroid cartilage, and, being provided with a synovial membrane and a capsular ligament, forms a distinct joint which allows of a revolving motion between the two cartilages. On the upper border of the broad posterior portion there are also two oval convex surfaces for articulation with the bases of the arytenoid cartilages, the intervening cavity being occupied by the arytenoideus proprius muscle. The *arytenoid cartilages* are so called because when approximated by the action of the latter muscle they resemble the mouth of a pitcher. They are pyramidal in form, and play an important part in the mechanism of the larynx. These cartilages are symmetrically placed upon the upper and back surface of the cricoid cartilage, and therefore occupy the upper part of the interval between the posterior borders of the alæ of the thyroid cartilage. Their apices are directed backward and inward, while their anterior and posterior surfaces are respectively convex and concave. Their inner surfaces are

nearly flat, and face each other, being covered by the lining mucous membrane. The posterior surfaces afford attachment to the *arytænoideus muscle*. The anterior surfaces are irregular, and afford attachment to the thyro-arytænoideus muscle on each side and to the fold of mucous membrane called the upper or *false* vocal cord. Where the anterior surface rests upon the cricoid cartilage there is a pointed angle (the vocal process), to which is attached the *true* vocal cord. Each apex is surmounted by a nodule, the *corniculum laryngis* (of *Santorini*), which serves to continue the arytenoid cartilage upward and inward.

The **epiglottis** is a thin, oval, leaf-shaped plate of fibro-cartilage, the free rounded margin of which can usually be seen through the mouth when the tongue is protruded (Plate 13, Fig. 4, No. 17), and serves as a trap-door to close the glottis against the intrusion of food in deglutition. Its lower end is long and narrow, and connected by the *thyro-epiglottic ligament* to the angle of the thyroid cartilage just below the median notch between the two alæ and above the vocal cords. A fibrous connection also exists between it and the posterior surface of the hyoid bone,—the *hyo-epiglottic ligament*. The mucous membrane is extended from the base and sides of the tongue upon the anterior surface of the epiglottis in three folds, constituting the median, right, and left *glosso-epiglottic ligaments*. The posterior surface is covered with a number of little mucous glands lodged in depressions, and its mucous membrane is reflected upon each side, in loose folds, to the arytenoid cartilage, forming the *aryteno-epiglottic folds*. The function of the mucous glands is to keep the adjoining parts moist: they are peculiarly apt to become inflamed in those who speak much in public, and are the seat of “clergyman’s sore throat.” The laxity of the aryteno-epiglottic folds is due to the quantity of areolar tissue in their locality, which allows of considerable swelling in acute laryngitis, and becomes the seat of the dangerous condition known as “œdema of the glottis.” Foreign bodies of considerable size also often become retained for long periods of time within these folds of the mucous membrane. Within the aryteno-epiglottic folds there are small whitish nodules of cartilage, one on each side, in immediate relation to the apex of the arytenoid cartilage, and known as the *cuneiform* (or *Wrisberg’s*) cartilages.

Occasionally there are found minute accessory cartilaginous plates situated near the anterior borders of the vocal cords in the female larynx, to which has been attributed the power of the singing voice in the so-called "head-notes" (Seiler). The principal cartilages of the larynx, the thyroid, the cricoid, and the arytenoid, are of the hyaline variety, and have a tendency to ossify in old age; but the epiglottis, the cornicula, and the cuneiform cartilages do not change, being composed of yellow fibro-elastic tissue. Between the cartilaginous framework and the mucous lining there is a layer of elastic connective tissue, called the *laryngeal fascia*.

To one looking down into the cavity of the larynx the mucous membrane presents, in the middle line, below the epiglottis, an elevation known as the *cushion*, or *pulvinar*, of the epiglottis, from which a crescentic fold arches downward on each side enclosing some fatty tissue and ligamentous fibres, the *superior thyro-arytenoid ligaments*, or *false vocal cords*. Below these there is another pair of more prominent folds, which extend on each side from the anterior angles of the bases of the arytenoid cartilages to the sides of the middle thyroid fossa. These are composed of fibro-elastic tissue, the *inferior thyro-arytenoid ligaments*, or *true vocal cords*, and are covered with a very thin and closely-adherent layer of mucous membrane, through which their free inner margins appear as white glistening bands. The spaces between these upper and lower projections on each side are called the *ventricles of the larynx*, which are recesses opening into a small pouch, the *sacculus laryngis* (*of Morgagni*), and allow freedom to the vibrations of the true vocal cords. Each sacculus ascends between the upper fold and false vocal cord and the inner surface of the thyroid cartilage nearly to its upper border and at the side of the epiglottis. It contains a number of follicular glands, whose secretion lubricates the true vocal cords through the action of the so-called *compressor sacculi laryngis* muscle. The strength and depth of sound are probably due to the development of the ventricles.

The opening in the cavity of the larynx between the inferior or true vocal cords is the **glottis**. It is of triangular form, with the apex forward when the parts are at rest, but varies in shape, and becomes contracted or dilated, according as the vocal cords are rendered tense or relaxed by

muscular action. The glottis begins in a point at the back of the thyroid cartilage, and is bounded on each side by the inner edges of the true vocal cords and by the interval between the arytenoid cartilages. It is limited behind by the mucous membrane reflected over the arytenoideus muscle. The anterior portion of the opening, between the vocal cords, is called the *vocal area*, and the posterior portion, between the arytenoid cartilages, the *respiratory area*. The length of the glottis varies in the male and the female, being, after puberty, in the former a little less than two and a half centimetres, or an inch, and in the latter about two centimetres, or three-quarters of an inch. The width depends upon the degree of dilatation or contraction of the vocal cords. When they are at rest the widest part does not exceed four or five lines in the male and two or three lines in the female: hence the name *rima glottidis*, or chink of the glottis. In speaking or singing the glottis is narrowed and the vocal cords are nearly parallel. Below the true vocal cords the cavity of the larynx widens, becoming nearly circular at the lower margin of the cricoid cartilage. The vocal cords measure in the adult male a little over twelve millimetres, or half an inch, and in the female a little less. At puberty they undergo marked modification with the development of the rest of the vocal apparatus.

The *intrinsic muscles*, which act upon the larynx and are especially concerned in producing changes in the vocal cords by which they modify the voice, are arranged in four pairs,—the crico-thyroid, the thyro-arytenoid, the posterior and lateral crico-arytenoid, on each side, and a single one in the middle, the arytenoideus proprius muscle. The *crico-thyroid muscles* (Plates 23, 24, and 25) arise from the front and sides of the cricoid cartilage and pass obliquely to be inserted into the inferior border and cornu of the thyroid cartilage on each side. Acting from above, these muscles raise the hoop of the cricoid cartilage, and thereby depress the arytenoid cartilages so as to stretch and render tense the true vocal cords, the thyroid cartilage being at the same time fixed by the extrinsic thyro-hyoid muscles (page 236).

The crico-thyroid muscles receive their motor influence from the external branch of the superior laryngeal nerve, being the only muscles

of the larynx supplied by that nerve, while the rest of its branches, being sensory, are distributed to the mucous lining membrane of the organ. There are connecting filaments, however, between the superior laryngeal nerve and the inferior or recurrent laryngeal nerve, which furnishes all the other intrinsic laryngeal muscles with motion.

The *thyro-arytenoid muscles* each consist of two flat overlapping portions. The *outer* portions arise from the thyroid alæ and the contiguous portion of the crico-thyroid membrane, and pass backward to be inserted by some transverse fibres into the arytenoid cartilages, and by some oblique fibres into the aryteno-epiglottic folds, a few of the latter fibres passing to the epiglottis on each side and being therefore sometimes called the *thyro-epiglottic muscles*. The *inner* portions arise from the anterior attachment of the true vocal cords and the adjacent fossa of the thyroid cartilage, and, passing backward, are inserted into the anterior angles of the bases of the arytenoid cartilages. Their fibres run parallel with the true vocal cords, many of them blending with the thyro-arytenoid ligaments in their substance, the vocal fibres and others radiating beneath the mucous membrane over the ventricles of the larynx. Owing to the diversity of origin of their fibres, the thyro-arytenoid muscles are very complicated in their action. Their main use is to draw forward the arytenoid cartilages and thus to relax the vocal cords; but, owing to the connection of their inner portions with the cords, the degree of tension of the latter is supposed to be modified by the independent action of the vocal fibres of the muscles. The successive action of the various fibres in unison on both sides produces a rotation of the arytenoid cartilages inward, so that the rima glottidis is narrowed and the vocal cords are approximated, assuming the position necessary for phonation.

The *posterior crico-arytenoid muscles* arise from the flattened surfaces on the cricoid cartilage on each side of the posterior median ridge. Their fibres are also arranged in segments, most of them converging to the outer angles of the bases of the arytenoid cartilages, but some of the lowest fibres often pass to be inserted into the inferior cornua of the thyroid cartilage. The action of these muscles is brought into play at each inspiration during life, and serves to rotate the arytenoid cartilages

PLATE 26.

Figure 1.

The sternum and costal cartilages removed to show the anterior mediastinum, and particularly the relations of the pleurae to the pericardium.

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| <ol style="list-style-type: none"> 1. The right pneumogastric nerve. 2. The right recurrent laryngeal nerve. 3. The innominate artery. 4. The right innominate vein. 5. The superior vena cava. 6. The costal surface of the right pleural sac. 7. The sternal end of the right fifth rib. 8. The right pleural sinus overlapping the pericardium. 9. The sternal end of the right sixth rib. 10. The upper surface of the diaphragm. | <ol style="list-style-type: none"> 11. The left pneumogastric nerve. 12. The left scalenus anticus muscle. 13. The left subclavian artery. 14. The left subclavian vein. 15. The left innominate vein. 16. The left pleural sac. 17. The pericardium over the great vessels at the base of the heart. 18. The pericardium over the right ventricle of the heart. 19. The sternal end of the left fifth rib. |
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Figure 2.

Dissection of the vascular system of the foetus (at five months and a half).

N. B.—The injection was introduced by the umbilical vein, and the photograph represents the actual size.

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| <ol style="list-style-type: none"> 1. The right common carotid artery, pneumogastric nerve, and jugular vein. 2. The innominate artery. 3. The entrance of the superior vena cava into the right auricle of the heart. 4. The right lung in the back wall of the thoracic cavity. 5. The ductus venosus passing into the inferior vena cava. 6. The inferior vena cava. 7. The hepatic veins. 8. The portal vein. 9. The umbilical vein. 10. The umbilical cord. 11. The left common carotid artery and jugular vein. | <ol style="list-style-type: none"> 12. The arch of the aorta, showing the origin of the great arteries. 13. The ductus arteriosus. 14. The left branch of the pulmonary artery. 15. The pulmonary artery. 16. The left lung in the back of the thoracic cavity. 17. The heart, with the right and left coronary vessels. 18. The diaphragm. 19. The abdominal aorta. 20. The left kidney. 21. The left renal vein. 22. The right hypogastric artery. 23. The bladder. 24. The left hypogastric artery. |
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Figure 3.

Dissection of a child, three weeks after birth, showing especially the relations of the thymus gland and the supra-renal capsules.

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| <ol style="list-style-type: none"> 1. The crico-thyroid arteries. 2. The cricoid cartilage. 3. The thyroid body. 4. The right internal mammary artery and veins on the inner surface of the wall of the thorax, which is reflected outward. 5. The right innominate vein. 6. The thymus gland overlying the arch of the aorta and the left innominate vein. 7. The right lung. 8. The right auricle of the heart. 9. The right supra-renal capsule. 10. The right renal vein. | <ol style="list-style-type: none"> 11. The right kidney. 12. The inferior vena cava. 13. The left common carotid artery and jugular vein. 14. The left internal mammary vessels on the inner surface of the thoracic wall, reflected outward. 15. The pulmonary artery. 16. The left lung. 17. The right ventricle of the heart. 18. The left supra-renal capsule. 19. The abdominal aorta. 20. The hilum of the left kidney. 21. The branches of the superior mesenteric artery. |
|---|--|

Figure 4.

Photograph of a preparation (in the author's cabinet), showing a remarkable disposition of the heart and independent origins of all of the great vessels from the root of the aorta.

N. B.—This specimen was removed from the body of a young man, aged twenty-seven years, who died from phthisis. There is no arch to the aorta, and the position of the heart, when discovered, was vertical within the thorax, as shown in the figure. There is only one auricle and one ventricle. No other abnormality of the arteries was found in the body.

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| <ol style="list-style-type: none"> 1. The right external carotid artery. 2. The right internal carotid artery. 3. The right superior thyroid artery. 4. The right common carotid artery. 5. The right thyroid axis. 6. The independent origin of the right subclavian artery. 7. The left external carotid artery, branching into the lingual, facial, and temporal arteries. 8. The left internal carotid artery. | <ol style="list-style-type: none"> 9. The left superior thyroid artery. 10. The left common carotid artery. 11. The left vertebral artery. 12. The left transversalis colli and supra-scapular arteries. 13. The left subclavian artery. 14. The independent origin of the left subclavian artery. 15. The auricle of the heart. 16. The ventricle of the heart. 17. The descending aorta. |
|--|---|

Fig 1



Fig 2

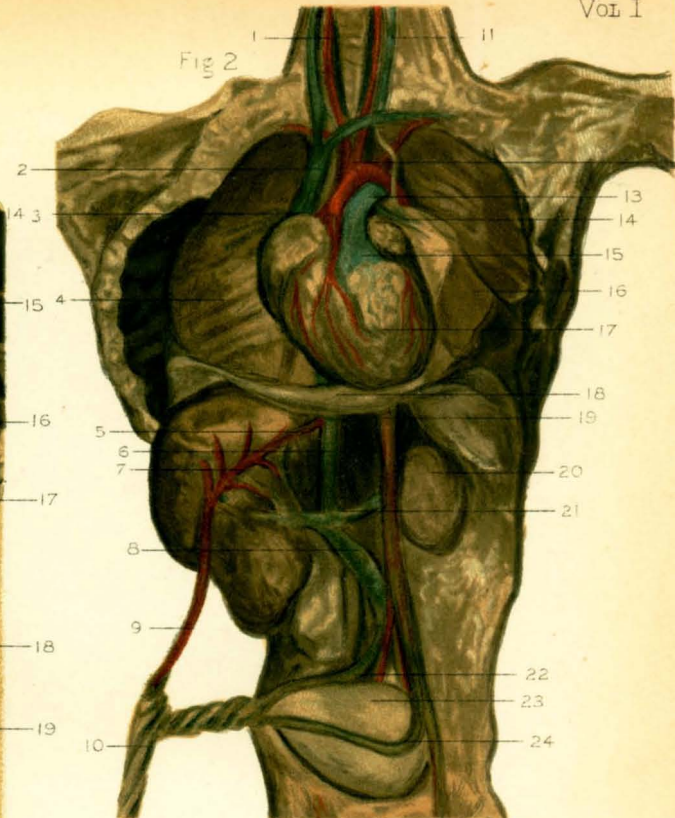


Fig 3

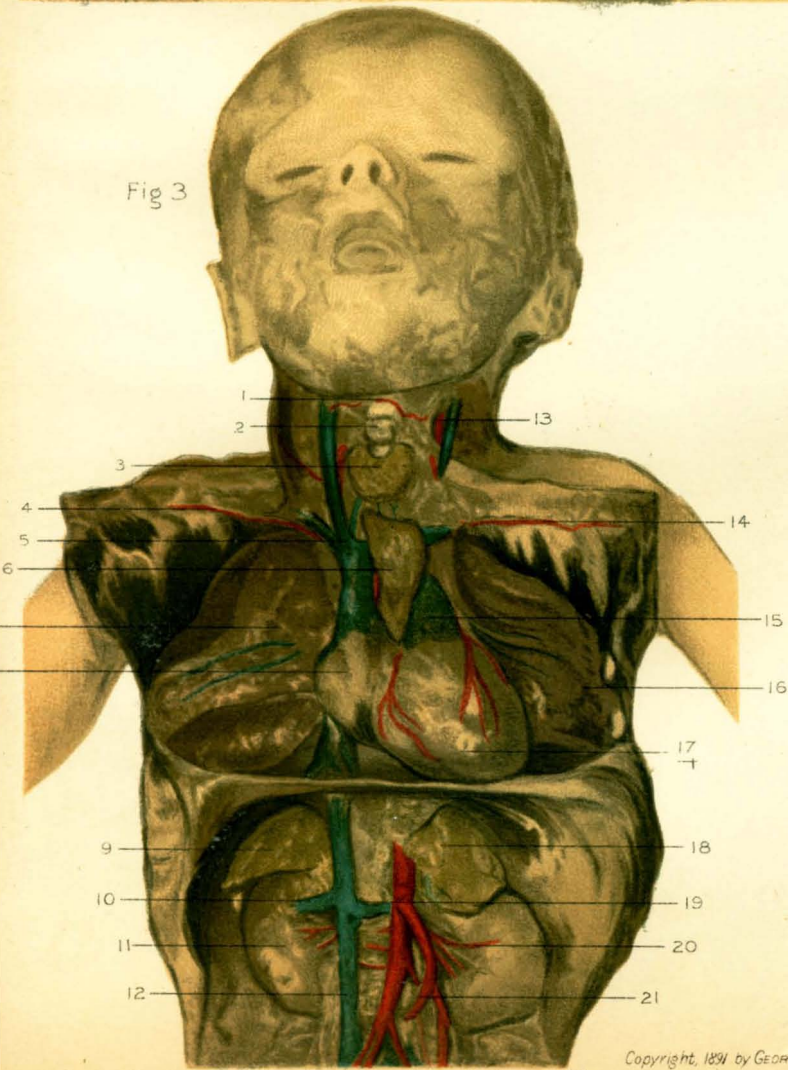
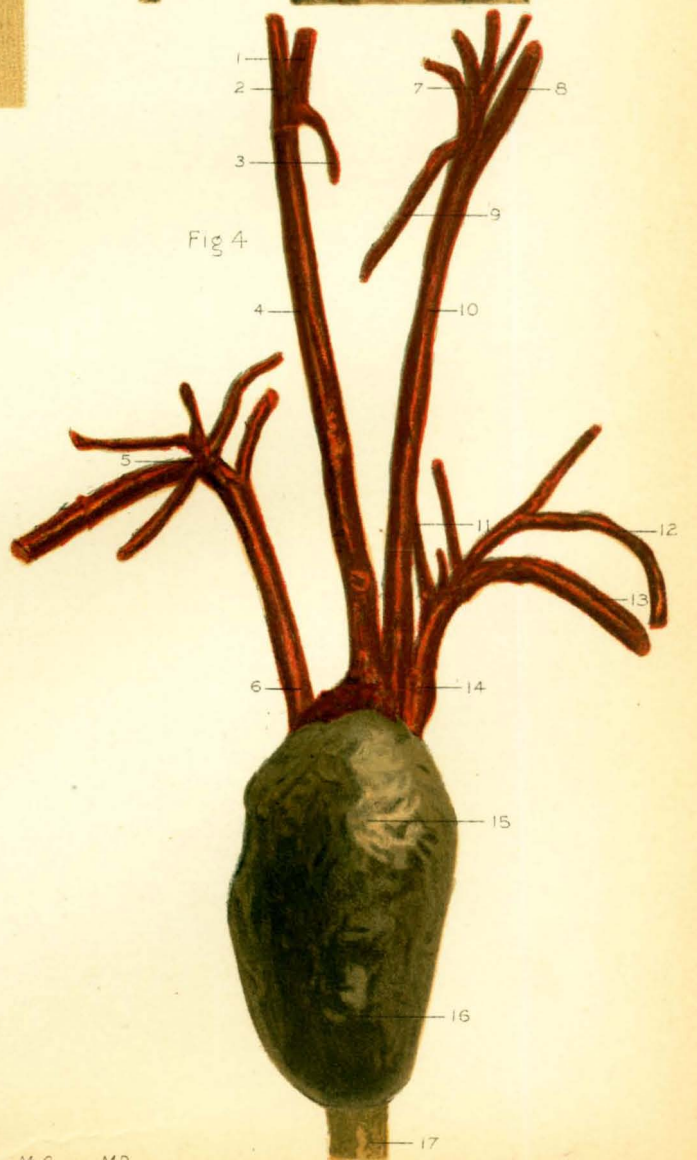


Fig 4



by drawing their outer angles toward the middle line, and consequently their anterior angles, to which the vocal cords are attached, from the middle line, so that the rima glottidis is dilated. The *lateral crico-arytenoid muscles* are much smaller than the posterior. They can be seen only by removing the alæ of the thyroid cartilage. They arise from the sides of the upper border of the cricoid cartilage, and are inserted by their converging fibres into the outer angles of the bases of the arytenoid cartilages in front of the posterior crico-arytenoid muscles. They serve to draw the arytenoid cartilages inward and forward, and thus to approximate and relax the vocal cords. The single *arytenoid muscle* is attached to the posterior surfaces of the arytenoid cartilages, and mainly consists of transverse fascicles, which serve to draw them together and thus cause the contraction of the rima glottidis. There are other muscular fibres, intimately connected with the former, which arise from the outer angles of the arytenoid cartilages and ascend obliquely from side to side, so that they cross one another, some to be attached to the apices of the opposite arytenoid cartilages, while others are continued within the aryteno-epiglottic folds to the sides of the epiglottis and are therefore sometimes called the *aryteno-epiglottic muscles*. The lower fasciculi of the latter constitute the *compressor sacculi muscles* (of *Hilton*), already referred to. Throughout the folds of the mucous membrane in relation to the epiglottis there are other bundles of muscular fibres, sometimes more developed than at other times, the functions of which have given rise to much speculation; but they are of little comparative importance, having probably nothing to do with the modification of the voice, but rather assisting the constricting influences upon the epiglottis in swallowing. At puberty these muscles are not so rapidly developed as the cartilages, and it is owing to this that the so-called "change of voice" occurs. These muscles become stronger with practice, according to the efforts of singers and speakers.

The *extrinsic muscles of the larynx* are those which are attached to the hyoid bone and thyroid cartilage, which they serve to fix so that the intrinsic muscles can act. They are described with the anterior region of the neck.

The *arteries of the larynx* are derived from the superior or descending thyroid branch of the external carotid artery and the inferior or ascending thyroid branch from the thyroid axis of the subclavian artery. The superior thyroid furnishes most of the blood-supply to the larynx by means of the *superior laryngeal artery*, which runs inward beneath the extrinsic laryngeal muscles, and, after passing between the middle and inferior pharyngeal constrictor muscles (page 173), penetrates the thyro-hyoid membrane and sends branches to the intrinsic muscles and mucous membrane. Sometimes this vessel perforates the ala of the thyroid cartilage. Its radicles anastomose freely with those of its fellow and with those from the inferior thyroid arteries, so that the mucous membrane is very vascular, as is demonstrated by the rapid engorgement and change from the ordinary pink color to a bright red in consequence of the slightest irritation. The external continuation of the superior laryngeal artery descends to the inferior border of the thyroid cartilage, close to which it courses over the crico-thyroid membrane and is here called the *crico-thyroid artery* (Plates 20, 23, 24, and 25). This vessel forms a little communicating loop with its fellow from the opposite side, which ordinarily is very insignificant, and, as the loop itself is nearer to the thyroid cartilage than the cricoid, it can be avoided in an emergency operation for laryngotomy by introducing the knife with the blade parallel to and just above the upper border of the cricoid cartilage and then turning the cutting edge downward toward the middle line. Occasionally, however, the crico-thyroid artery is quite large (Plate 24, Fig. 2, No. 30), or there may be present an anomalous branch from the superior thyroid artery (Plate 25), occupying its position: so that, if time permits, it is safer not to open the larynx without making a preliminary cutaneous incision and exposing the crico-thyroid membrane for examination. In children the crico-thyroid space is very small, and the hoop of the cricoid cartilage must be cut through if it is desired to insert a canula. The mucous lining at the top of the trachea is so loose that a canula may be introduced between it and the membrane instead of entering the trachea. This in fact has happened at the hands of skilful operators. The *veins of the larynx* accompany the arteries, and terminate in the *superior, middle, and inferior thyroid veins*.

The *nerves of the larynx* are the branches of the superior or descending and inferior (recurrent) or ascending laryngeal branches of the pneumogastric nerve. The *superior laryngeal nerve* arises from the inferior ganglion of the pneumogastric nerve, descends by the side of the pharynx between the middle and inferior constrictor muscles, in close company with the superior laryngeal artery, and divides into the internal and external laryngeal nerves. The *internal laryngeal nerve* penetrates the thyrohyoid membrane, with the internal branch of the artery, and endows the mucous membrane throughout the larynx with sensibility, which is normally very acute in the folds about the epiglottis, so that the entrance of the air-passage is guarded against the danger of food passing the wrong way in the act of deglutition. Whenever a foreign body, such as a crumb or a fish-bone, touches the mucous membrane of the larynx, it induces a spasmodic cough and an involuntary attempt to expel it. The sensibility of the lining mucous membrane is, however, variable, and it is remarkable that when foreign bodies are retained within its folds their presence is not only tolerated, but the patient in a little while becomes unconscious of them. It is owing to this fact that the modern method of "intubation" for the relief of stenosis of the larynx is at all feasible. It is probable, too, that the usual sensibility of the mucous membrane is diminished when the parts are œdematous from inflammation. The branches of the internal laryngeal nerve form plexuses beneath the epithelial layer of the mucous membrane, terminate either in end-bulbs or bodies resembling the taste-buds of the tongue, and are surrounded with ganglionic cells. There are fewer of these in relation to the true vocal cords than elsewhere in the larynx. This nerve is connected with the inferior laryngeal nerve by a filament which passes downward behind the ala of the thyroid cartilage, and another filament usually pierces the arytaenoideus muscle, probably supplying it. The *external laryngeal nerve*, after descending beneath the depressor muscles of the larynx, supplies mainly the cricothyroid muscle. It furnishes a twig also to the adjacent lobe of the thyroid body.

The *inferior (or recurrent) laryngeal nerves* arise from the pneumogastric nerves at the root of the neck (Plates 32, 33, 35, and 40), but

differ in their relations upon the two sides. The *right* inferior laryngeal nerve leaves the pneumogastric at the lower border of the subclavian artery, near its origin from the innominate artery, and takes an oblique course upward *under* the subclavian and inferior thyroid arteries to the side of the trachea. The *left* inferior laryngeal nerve leaves the pneumogastric at the lower border of the arch of the aorta, about the commencement of its descending portion, and winds upward *under* it toward the trachea. On both sides the nerves occupy the groove between the trachea and the œsophagus (Plate 24, Fig. 2), and enter the larynx beneath the inferior constrictor muscle, sending branches to all the intrinsic laryngeal muscles except the crico-thyroid, as already stated (page 180).

The *recurrent* course of the inferior laryngeal nerves has attracted the attention of anatomists from the time of Galen, and many different explanations for it have been offered. It is probably due to the variations that take place commensurate with the developmental changes in the branchial apparatus of the embryo in this region, and the *normal* courses of these nerves, upon the right and left sides, as above given, are consequent upon the relations of the great arteries at the root of the neck. It has been observed that when these arteries vary in their origin, especially the right subclavian, the right inferior laryngeal nerve is not recurrent, but leaves the right pneumogastric opposite the cricoid cartilage.

The *lymphatic vessels of the larynx* accompany the veins and end in the deep cervical lymphatic glands about the lateral lobes of the thyroid body.

Being situated between the trachea and the hyoid bone, which supports the tongue, the larynx is consequently subordinated to the movements of that organ. The mobility of the larynx is necessary for the acts of swallowing and speaking. During the latter act the larynx is raised in the emission of high sounds and lowered in that of deep sounds. During swallowing, the larynx is raised upward and forward. In moving forward it opens the orifice of the gullet so that it can receive the bolus of food, and in moving upward it meets the base of the tongue, which closes the epiglottis over the glottis so that particles of the food cannot enter the respiratory apparatus. The mobility of the larynx renders

operations on the organ very difficult, and it is essential in all such that the organ should be first steadied as much as possible.

The trachea is described with the anterior region of the neck (page 236).

THE REGION OF THE NECK.

The *skeleton of the neck* (Plates 1 and 28) is so well covered by the surrounding soft structures (Plates 12 and 14) that its prominences are less conspicuous to external observation than those of any other region of the body. The relations of the component parts of the neck are considerably influenced by the position of the cranium, which is supported, somewhat behind its axis, upon the most flexible portion of the vertebral column. It should be remembered that a line drawn from side to side in front of the mastoid processes will bisect the condyloid processes, and that the upper-jaw teeth are on a line with the foramen magnum at the base of the skull. If a horizontal section of the neck is made about the level of the fifth cervical vertebra (Plate 14, Fig. 1, No. 1), the segment of the body of that vertebra will be found in the *anterior part* of the section, together with the gullet, windpipe, great vessels, nerves, and glands, while the muscles which hold the head erect upon the spine will occupy principally the posterior part.

The bony landmarks of the neck are very few, but they are very important. They can be ascertained by pressure or manipulation, and by changing the relative positions of the head and trunk.

When the body is upright, with the shoulders squared and the head held so that the face looks straight forward, a line drawn obliquely from the occipital protuberance along the body of the lower jaw to the chin is about parallel with a line drawn from the lower border of the first dorsal vertebra to the top of the sternum; and these two lines may be considered as the upper and lower limits of this region. The atlas vertebra cannot be felt at the back of the neck through the external parts, but by bending the head forward or backward the spinous processes from the second to the seventh cervical vertebra can be readily detected. The seventh vertebra is always so well marked (Plate 1, No. 15) that it has received